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As I consider the Bridgeton specimens to almost certainly belong in the latter family, but without any characters by which they can be identified positively with any living genus, I have thought it advisable to include them under *Anomalophyllites*, with a specific name to indicate the locality where they were found.

The abundance of these remains is evidence that the plant to which they belonged was an important element in the flora of the region and of that of the geological age in which they flourished, and considerably extends our knowledge of the geographical range of palms in the past.

#### Explanation of Plates.

##### PLATE 311.

Figs. 1-3.—*Anomalophyllites Bridgetonensis* Hollick. Fragments of free divisions; fig. 1 including leaf of *Ulmus plurinervia* Ung.

Figs. 4 and 5.—Fragments of petioles; fig. 5 including leaf of *Quercus Klipsteinii* Etts.

Fig. 6.—Fragment of a free division. ("Cyperites, spec?" Lesq.)

##### PLATE 312.

Figs. 1-4.—*Anomalophyllites Bridgetonensis* Hollick. Fragments of median portion of leaf.

##### PLATE 313.

Figs. 1, 6 and 7.—*Anomalophyllites Bridgetonensis* Hollick. Fragments of median portion of leaf; figs. 1 and 6 showing indications of separation into free divisions at summits.

Figs. 2, 3-5.—Fragments of basal portion of leaf, showing folds.

### Studies in the Botany of the southeastern United States.—XI.

BY JOHN K. SMALL.

#### I. NOTEWORTHY SPECIES.

SAGITTARIA FILIFORMIS J. G. Smith, Rep. Mo. Bot. Gard. 6: 46.  
pl. 15. 1894.

Mr. A. H. Curtiss has sent me fine fruiting specimens of this rare species, collected near Jacksonville, Florida. They are apparently the first specimens found with mature achenes; these are of the same general outline as the immature achenes figured by Mr. Smith, but slightly broader. In the center of each face there is an oblong swelling surrounded by a depression, while the edges

are crested. The lengths of numerous achenes vary from 1.5–2 mm.

ARENARIA BREVIFOLIA Nutt.; T. & G. Fl. N.A. 1: 180. 1838.

I have long suspected the occurrence of this, the rarest of our eastern American *Arenarias*, in North Carolina. In 1890 Mr. Heller collected fragmentary and imperfect specimens of an *Arenaria* in Rowan County. Some years later I found similar specimens on Dunn's Mountain, near Salisbury. During the spring of 1896 I had an opportunity to visit Dunn's Mountain and found the species in full bloom just as it occurs on Stone Mountain, Georgia; the plants from the two mountains are almost identical.

RHEXIA MARIANA L. Sp. Pl. 346. 1753.

As far as I have observed, *Rhexia Mariana* prefers sandy places at no great distance from the Atlantic and Gulf coasts, although it does occur at many points in the middle districts of the Southern States, and is said to extend up the Mississippi Valley to Missouri. The first altitude worthy of note at which I found the species was at about 300 meters on Stone Mountain, Georgia. The following year, 1895, I collected a few specimens of a delicate form, apparently referable to this species, on the mountains near Ellijay, Gilmer County, Georgia, at an altitude of about 400 meters. The leaves of this form are thin, oval, ovate or elliptic and short-petioled. Much to my surprise, on reaching the summit of Table Mountain, South Carolina, last summer, I found the typical state of the plant thriving at an altitude of almost 1000 meters.

SABBATIA CAMPANULATA (L.) Britton, Mem. Torr. Club, 5: 259. 1894.

Dr. Gray has recorded\* the mountains of Georgia as an extension of the range of this normally coast plant. I do not know to how great an altitude the species ranges in Georgia, but I have collected it at an elevation of nearly 1000 meters on the summit of Table Mountain, South Carolina, and the only noticeable difference between the mountain specimens and those from the low-

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\* Syn, Fl. 2: Part 1, 115.

lands is the proportionate breadth of the leaves, these being wider in the plants from the higher altitudes.

PHACELIA HIRSUTA Nutt. Trans. Am. Phil. Soc. (II.) 5: 191.  
1833-37.

Although classed as an annual, this *Phacelia* appears to be a biennial. Mr. Nuttall, in the original description, says "annual or perhaps also biennial." On Stone Mountain, Georgia, the species flowers in the spring, the plants soon die and disappear on account of the extreme heat, the seeds falling to the ground at once germinate, producing tufts of spatulate, oblong-spatulate or obovate, short-petioled, sharply serrate leaves which are not in the least pinnatifid, as are those of the following season.

VITEX AGNUS-CASTUS L. Sp. Pl. 637. 1753.

This shrub is fast becoming naturalized in the Southern States. Miss K. S. Taylor found it about Columbia, South Carolina, in 1891, and I collected it in 1895 at both Darien and near Fort Barrington, in southeastern Georgia.

CESTRUM PARQUI L'Her. Stirp. Nov. 73. 1783-84.

We have no record of the occurrence of this species on our eastern sea-board, but it is now doubtless established at many places in the Southern States. In 1895 I found quantities in and about Darien, Georgia.

LEONOTIS NEPETAEFOLIA Ait. Hort. Kew. Ed. 2, 3: 409. 1811.

Dr. Chapman reports this introduced plant from Georgia and Florida. We now have excellent specimens collected by Prof. Underwood at Auburn, Lee County, Alabama.

FILAGO NIVEA.

*Evax multicaulis* DC. Prodr. 5: 459. 1836. Not *Filago multicaulis* Lam. 1778.

This is one of the Compositae belonging west of the Mississippi River that has been traveling gradually eastward; in 1895 I found it very plentiful about Stone Mountain, Georgia.

## II. NEW SPECIES.

## LISTERA RENIFORMIS.

Perennial, fleshy, deep green. Stem erect, 1–3 dm. tall, slender glabrous or nearly so below, densely glandular-pubescent above, simple; leaves 2, opposite, about the middle of the stem, reniform or ovate-reniform, 1–3 cm. in diameter, apiculate or short acuminate, glabrous above, more or less pubescent beneath, cordate or subcordate, sessile; racemes 2–10 cm. long; flowers greenish; bracts lanceolate or ovate-lanceolate, 3–5 mm. long, acute; pedicels slender, 4–7 mm. long, glabrate, or much less pubescent than the stem; sepals oblong or linear oblong, about 3 mm. long, obtuse or acutish, reflexed; lip wedge-shaped, 6–7 mm. long, with 2 prominent teeth on both sides near the base, sharply cleft to near the middle, the lobes rounded; capsules oval, 4–5 mm. long; mature seeds not seen.

Damp thickets on the mountains of Maryland, Virginia and North Carolina, ranging from about 1000 to 1750 meters altitude. Spring and summer.

It seems strange that this well marked species should have been so long associated with the northern *Listera convallarioides*. It is confined to the higher parts of the southern Alleghany mountains, while *Listera convallarioides* appears to have a northern transcontinental range suggesting that of *Polygonum Douglasii*. *Listera reniformis* differs from its northern relative in its more slender habit, the reniform type of the leaves, which are apiculate or short-acuminate at the apex and cordate or subcordate at the base, and the lip, which is sharply cleft, often nearly to the middle, by a V-shaped sinus. The leaf of *Listera convallarioides* is oval and obtuse at both ends, while the lip is cut by a U-shaped sinus.

## ASARUM CALLIFOLIUM.

Perennial, deep green, nearly glabrous. Leaves tufted, long-petioled, the blades ovate, 5–9 cm. long, obtuse or sometimes acutish, finely undulate or crenulate, rarely mottled, deeply cordate at the base; petioles 2–3 times longer than the blades, sparingly pubescent; bracts reniform, ciliate; pedicels as long as the calyx, or much shorter; calyx urn-shaped, 1.5–2.5 cm. long, dark green without, dark purple within, the segments broadly ovate or broader than high, the throat slightly contracted; stigmas 2-cleft, capsule not seen.

In shady woods, Florida. (Chapman.)

This is probably the *Asarum arifolium* of Dr. Chapman's Flora, but not the plant of Michaux, specimens of which I have never seen from further south than Georgia. It differs from *Asarum arifolium* in both foliage and inflorescence. The leaf-blades are simply ovate, and lack the halberd-shape so characteristic of those of the Michauxian plant, and the margin instead of being entire is finely undulate or crenulate. The pedicels are always short, never elongating like those of *A. arifolium*, while the perianths of the two species are entirely dissimilar in shape; that of *Asarum callifolium* being larger, much shorter in proportion to the length and with a rounder base.

#### ARISTOLOCHIA CONVULVULACEA.

Perennial, slender, bristly-pubescent throughout. Stems erect or decumbent, 1-3 dm. long, angled, slightly flexuous, simple, or rarely branched below; leaves thinnish, becoming firm at maturity, broadly ovate to oval, 2-8 cm. long, short-acuminate or rarely acute, ciliate, deeply cordate at the base, short-petioled; petioles .5-1.5 cm. long, hirsute; peduncles slender, 1-2-flowered, flexuous, angled; calyx densely hirsute, the tube .5-1 cm. long, the limb 6-8 mm. broad, scarcely lobed; capsule subglobose, 6-7 mm. in diameter, pubescent.

In woods, " . . . Columbus, Georgia. Grows from Athens to near this place " (Boykin).

Dr. Boykin noticed the differences between *Aristolochia Serpentaria* and the one here described as new, many years ago. Besides observing the plant in the field, he cultivated it in his garden, and sent both native and cultivated specimens to Dr. Torrey in whose herbarium they are preserved.

*Aristolochia convolvulacea* can readily be distinguished from *A. Serpentaria* by either the pubescence or the foliage. In place of the soft pilose hairs characteristic of *Aristolochia Serpentaria*, we find a bristly-hirsute pubescence on all parts of the plant. The leaves are much broader in proportion to their length than those of its relative, resembling closely those of some Convolvulaceae, whence the name.

#### PARONYCHIA SCOPARIA.

Perennial, rather slender, the foliage minutely pubescent. Stem much branched at the base, the branches tufted, erect or

ascending, 2–3 dm. tall, simple below, sparingly forked above, roughish; leaves linear-filiform, 1–3 cm. long, acute, grooved on either side of the midrib, serrulate-ciliate, especially near the apex, sessile; stipules linear-lanceolate, 1–1.5 cm. long, attenuate; branches of the cymes erect or strongly ascending; sepals linear-lanceolate, gradually narrowed to the apex, 3–3.5 mm. long, firm, keeled, usually with a short lateral nerve on each side of the keel, hooded, prolonged into a stout ascending cusp, which is one-third to one-fourth as long as the body; petals none; stamens half as long as the sepals; anthers yellowish.

The specimens on which the above species is founded were collected by Dr. Edward Palmer, in the Indian Territory, between Fort Cobb and Fort Arbuckle, in 1868. (No. 27.)

As far as I know, *Paronychia scoparia* has not been referred to any previously described species. It is related to *P. dichotoma*, differing in the more robust habit, the minutely pubescent foliage and the strict few-flowered cymes. *Paronychia scoparia* has a larger calyx than *P. dichotoma*, the cusps are longer and more densely spiny-ciliate, and the calyx-segments are more strongly ribbed on the back.

#### PARONYCHIA CHORIZANTHOIDES.

Annual, slender, minutely pubescent. Stem erect, 1–2 dm. tall, forking from a point 3–8 cm. above the base; leaves linear-filiform, .8–2 cm. long, acute, with a stout midrib, sessile; stipules lanceolate, silvery, acuminate; calyx short-pedicelled, or nearly sessile, 1.5 mm. long, strigose at the base, finally urn-shaped, the base much enlarged; sepals ovate or ovate-lanceolate, with a stout midrib, abruptly contracted into the ascending cusps which are about one-half as long as the body at maturity; utricle nearly 1 mm. broad.

The specimens on which the species here described as new is founded were collected by Dr. Edward Palmer at Bluffton, Burnet County, Texas, 50 miles west of Georgetown, October 10–15, 1879, according to printed ticket, or 1883, no. 1169, according to written label. Heretofore specimens of this collection have been referred to *Paronychia setacea*, which species, however, they but slightly resemble. *Paronychia chorizanthoides*, as the name suggests, bears a remarkable resemblance to some species of *Chorizanthe*, chiefly on account of the involucre-like calices. In *Paronychia chorizanthoides* the bracts subtending the calyx are shorter than that organ, while

in *P. setacea* they are longer. The calyx of the new species is sharply diagnostic, being urn-shaped with a much enlarged base, the calyx of *P. setacea* being turbinate and narrowed at the base. The cusps terminating the sepals are much stouter and only about one-half as long as the very slender cusps of *P. setacea*. Mr. Heller's number 1729, distributed as *P. setacea*, is *Paronychia chorizanthoides*, but, being quite young, it has not yet assumed the characteristic habit that Dr. Palmer's specimens exhibit.

#### SIPHONYCHIA CORYMBOSA.

Perennial, stoutish, the foliage pubescent with recurved hairs. Stem branched at the base, the branches tufted, 1-3 dm. tall, erect or ascending, olive-green or brownish, forking, especially above, ribbed, topped by the corymbosely disposed cymes; leaves oblanceolate to oblong-ob lanceolate, .5-1.5 cm. long, acutish, ciliate, sessile; stipules ovate, silvery, long-acuminate; inflorescence silvery; calyx 2-2.2 mm. long, pubescent at the base, the segments oblong or ovate-oblong, white, longer than the tube, obtuse, concave, slightly hooded at the apex; stamens included; style exerted; utricle ovoid, 1 mm. long.

The original specimens were collected by Professor L. M. Underwood on Ship Island, on the coast of Mississippi, in June, 1896.

*Siphonichia corymbosa* is most closely allied to *Siphonichia erecta*, which it simulates in habit. The characteristic difference in appearance between the two species is in the foliage, that of *S. erecta* being glaucous, while that of the new species is clothed with a pubescence consisting of short recurved hairs; the inflorescence of *Siphonichia corymbosa* is more lax; the calyx furnishes good distinctive characters: that of the new species is shorter and stouter, the segments oblong, with converging tips, instead of lanceolate, with erect tips, as in that of *S. erecta*.

#### CLEMATIS GLAUCOPHYLLA.

Perennial, bright green, glabrous. Stem rather slender, 2-5 meters long, climbing over bushes or trees, nearly simple, dark red, furrowed, much enlarged at the nodes; leaves ovate, 3-10 cm. long, thickish, acute, often apiculate or acuminate, entire, 3-lobed or trifoliate, with conspicuous white nerves above, prominently nerved and glaucous beneath, cordate or subcordate; floral leaves with petioles 1 cm. long, the nerves gradually diverging from the midrib; flowers reddish purple, glossy, 2-2.5 cm. long; calyx



conic-ovoid; sepals lanceolate, acuminate, the tips very slightly spreading; achenes suborbicular, 6–8 mm. in diameter, puberulent, abruptly narrowed at both ends, with an orbicular impression in the middle, sometimes slightly inequilateral, the plumose style erect or slightly oblique, 5–6 cm. long, tawny, lustrous, the hairs spreading.

Collected by the writer in the Yellow River valley, near McGuire's Mill, Gwinnett county, Georgia. In flower July 2, 1895, in fruit July 11, 1893.

A handsome species between *Clematis Addisonii* and *C. Viorna*, with foliage somewhat resembling that of the former and with the habit of the latter. It differs from *C. Addisonii* in its much elongated and climbing stem, and the distinctly petioled and acute floral leaves. It may readily be distinguished from *C. Viorna* by its suborbicular achene and longer plumose styles, as well as by the foliage.

#### LOBELIA FLACCIDIFOLIA.

Perennial, slender, deep green, glabrous or nearly so. Stems erect, 2–6 dm. tall, solitary, or loosely tufted, usually branched above, or, in small plants, rarely simple, the branches wire-like; leaves thin, the basal or lower cauline obovate or oblong-spatulate, the rest linear-oblong or rarely linear-lanceolate, 3–10 cm. long, obtuse, undulate or crenate-undulate, short-petioled; racemes interrupted, .5–2 dm. long, recurved; pedicels erect, slightly curved, 4–5 mm. long, usually exceeded by their bracts; calyx glabrous, its tube broadly turbinate, becoming globose-hemispheric and strongly ribbed, its segments linear-lanceolate, 4–5 mm. long, acute, spiny-toothed, auricled at the base, slightly revolute; corolla about 1.5 cm. long, blue, sparingly pubescent without, the segments of the upper lip reflexed, crisped, about  $\frac{1}{2}$  as long as the tube, the lower lip as long as the tube, its segments acute, the middle one lanceolate, the lateral ones oblong-lanceolate; staminal tube ascending, anthers pubescent; capsule ovoid, 5–8 mm. long, beaked, the free portion somewhat shorter than the part adnate to the calyx-tube.

In sand in deep river swamps, southern Georgia. Summer.

The species here described as new is, on the whole, most closely related to *Lobelia Ludoviciana*, from which it differs in the delicate habit, the very thin texture of the leaves and the branching stems; there are characters in the flower to separate it from the Louisiana plant in the narrower calyx-segments and narrower segments of the lips of the corolla.

The original specimens were collected by the writer in the Ochlockonee River swamp, near Thomasville, Georgia, July 12-22, 1895.

#### ASTER CAMPTOSORUS.

Perennial, slender. Stems erect, 4-6 dm. tall, finely ridged, slightly flexuous, green or purplish green, simple or nearly so, glabrous, or very sparingly pubescent near the top; leaves few, the blades lanceolate, 6-15 cm. long, resembling the leaves of *Camptosorus rhizophyllus*, attenuate from near the base to the finely acute apex, entire, undulate, sometimes crisped, dark green, smooth and lustrous above, paler and hispid beneath with a scattered pubescence, the lower ones deeply cordate at the rounded ear-like base, the upper ones subcordate or truncate, petioled; petioles slender, villous, the lower ones nearly as long as the blades, the upper about  $\frac{1}{2}$  as long as the blades; heads usually few; pedicels angled, bearing minute appressed bracts, scabrous with short, stiff, spine-like hairs; involucre cylindric-campanulate, constricted at the middle (or turbinate in the dry state), 5 mm. high, the bracts linear-subulate, in 4 or 5 series, incurved, with a narrow green midrib and green acute tip; corolla about 6 mm. long; stamens and style glabrous; rays purple, linear-ob lanceolate, 1 cm. long, slightly 3-toothed at the apex.

In open woods, in and near the mountains, Georgia and Alabama. September to October.

A very curious and handsome species on account of the close resemblance of its leaves to those of *Camptosorus rhizophyllus*. Compared with its nearest relative, *Aster Shortii*, the new species is more slender and, in addition to the *Camptosorus*-like leaves, and the characteristic gradual attenuation from the base to the apex, these organs are smooth, dark green and lustrous above. The involucre of *Aster Shortii* is campanulate, whereas that of *Aster Camptosorus* is cylindric-campanulate and constricted at the middle; the bracts in the new species are rigid, linear-subulate and incurved, while those of *Aster Shortii* are rather thin, hardly rigid and simply linear.

Fine specimens were sent to me by Prof. Carl F. Baker from Wright's Mill, five miles south of Auburn, Alabama. They were collected on October 17, 1896. In addition to these I find an old sheet in the Columbia University Herbarium on which are two specimens collected in the mountains of Georgia by Mr. Buckley.